DUCT SYSTEMS

780 CMR 3619.1 DUCT CONSTRUCTION

3619.1.1 Materials - duct construction: Ducts and duct materials used for a duct serving heating and cooling equipment shall be fabricated in accordance with the provisions of 780 CMR 3619.1.

3619.1.1.1 Above ground duct systems: Above ground duct systems shall conform to the following:

1. Equipment connected to duct systems shall have a 250?F (121?C) temperature limit control.
2. Factory-made air ducts shall be constructed of Class 1 or Class 2 materials as designated in Table 3619.1.1a. Class 2 materials shall not be used for ducts located within the first three feet (914 mm) of the bonnet, plenum or casing of the heating unit.
3. Minimum thicknesses of metal duct material shall be listed in Table 3619.1.1b. Galvanized steel shall conform to ASTM A 525.
4. Gypsum products may be used as ducts or plenums, provided that the air temperature does not exceed 125?F (52?C) and exposed surfaces are not subject to condensation.
5. Return ducts, except those portions directly above the heating surface or closer than two feet (610 mm) to the heating unit casing, shall be constructed of materials having a flame-spread rating not greater than 200.
6. Structural areas between studs or partitions to be used as return ducts shall be isolated from unused spaces with tight-fitting stops of sheet metal, or with wood not less than 2-inch (51 mm) nominal thickness.

3619.1.1.2 Underground duct systems. Underground duct systems shall be constructed of approved concrete, clay, metal or plastic. The maximum duct temperature for plastic ducts shall not be greater than 150?F (66?C). Plastic pipe and fittings shall conform to cell classification 12454-B of ASTM D 1248 or ASTM D 1784, and external loading properties of ASTM D 2412.

3619.1.2 Factory-made ducts: Factory-made air ducts or duct material shall be approved for the use intended, and shall be installed in accordance with the manufacturer's installation instructions. Each portion of a factory-made air duct system shall bear a listing and label indicating compliance with UL 181 and UL 181A.

3619.1.2.1 Duct insulation materials: Duct insulation materials shall conform to the following requirements:

1. Duct insulation shall comply with the energy conservation requirements of 780 CMR 3603.21.;
2. Duct coverings and linings shall have a flame-spread rating not greater than 25, and a smoke-developed rating not greater than 50.
3. Duct coverings and duct linings shall withstand a test temperature of 250?F (121?C) minimum.
4. Blanket insulation and factory-insulated flexible duct shall be labeled with the R-value, flame-spread rating, and smoke-developed rating.

3619.1.2.2 Vibration isolators: Vibration isolators installed between mechanical equipment and metal ducts shall be fabricated from approved materials and shall not exceed ten inches (254 mm) in length.

3619.1.3 Installation: Duct installation shall comply with 780 CMR 3619.1.3.1 through 3619.1.3.8.

3619.1.3.1 Duct sizing: Supply and return ducts shall be sized according to ACCA Manual D or SMACNA Installation Standards for Residential Heating and Air Conditioning Systems or other approved methods.

3619.1.3.2 Joints and seams. Joints of duct systems shall be made substantially air tight by means of tapes, mastics or gasketing. Crimp joints for round ducts shall have a contact lap of at least 1½ inches (38 mm) and shall be mechanically fastened by means of at least three sheet metal screws equally spaced around the joint.

TABLE 3619.1.1a
CLASSIFICATION OF FACTORY-MADE AIR DUCTS

DUCT CLASS	MAXIMUM FLAME SPREAD RATING
0	0
1	25
2	50

TABLE 3619 1.1b
GAGES OF METAL DUCTS AND PLENUMS USED FOR HEATING OR COOLING

TYPE OF DUCT	SIZE (INCHES)	NOMINAL THICKNESS (inches)	EQUIVALENT GALVANIZED SHEET GAGE	APPROXIMATE ALUMINUM B. & S. GAGE
Round ducts and enclosed rectangular ducts	14 or less	0.016	30	26
	over 14	0.019	28	24
Exposed rectangular ducts	14 or less	0.019	28	24
	over 14	0.022	26	22

For SI: 1 inch = 25.4 mm.

3619.1.3.3 Support: Metal ducts shall be supported by one-inch (2mm) by 18-gage metal straps, 12-gage galvanized wire at intervals not exceeding ten feet (3048 mm). Nonmetallic ducts shall be supported in accordance with the manufacturer's installation instructions.

3619.1.3.4 Firestopping: Duct installations shall be firestopped in accordance with 780 CMR 3606.2.7.

3619.1.3.5 Duct insulation: Duct insulation shall be installed in accordance with the following requirements:

1. All ductwork shall be insulated in accordance with 780 CMR 3603.21.
2. Vapor retarders with a maximum permeance of 0.05 perm [(2.87 ng/(s m2 Pa)], or aluminum foil with a minimum thickness of two mils (0.051 mm), shall be installed on cooling supply ducts that pass through nonconditioned spaces conducive to condensation.
3. Exterior ducts shall be protected with weatherproof covering capable of ultraviolet (UV) protection.
4. Duct coverings shall not penetrate a firestopped wall or floor.

3619.1.3.6 Ducts in slabs: Ducts shall be listed and labeled for underground installation. Metallic ducts not having an approved protective coating shall be completely encased in a minimum of two inches (51 mm) of concrete. Metallic ducts having an approved protective coating and nonmetallic ducts shall be installed in accordance with the manufacturer's installation instructions.

3619.1.3.7 Factory-made air ducts: Factory-made air ducts shall not be installed in or on the ground, in tile or metal pipe, or within masonry or concrete.

3619.1.3.8 Metal duct separation: Metal ducts shall be installed with at least four inches (102 mm) separation from earth.

3619.1.4 Under-floor plenums: An under-floor space used as a supply plenum shall conform to the requirements of 780 CMR 3619.1.4. Fuel gas lines and plumbing waste cleanouts shall not be located within the space.

3619.1.4.1 General: The space shall be cleaned of loose combustible materials and scrap, and shall be tightly enclosed. The ground surface of the space shall be covered with a moisture barrier having a minimum thickness of four mils (0.102 mm).

3619.1.4.2 Materials: The under-floor space, including the sidewall insulation, shall be formed by materials having flamespread ratings not greater than 200.

3619.1.4.3 Furnace connections: A duct shall extend from the furnace supply outlet to not less than sixinches (153 mm) below the combustible framing. This duct shall comply with the

provisions of 780 CMR 3616.2.1. A noncombustible receptacle shall be installed below the floor opening into the plenum in accordance with the following requirements:

1. The receptacle shall be securely suspended from the floor members and shall not be more than 18 inches (457 mm) below the floor opening.
2. The area of the receptacle shall extend three inches (76 mm) beyond the opening on all sides.
3. The perimeter of the receptacle shall have a vertical lip at least one inch (25 mm) high at the open sides.

3619.1.4.4 Access: Access to an under-floor plenum shall be provided through an opening in the floor with minimum dimensions of 18 inches by 24 inches (457 mm by 610 mm).

3619.1.4.5 Furnace controls: Furnace controls shall conform to the applicable requirements of 527 CMR or 248 CMR

Exception: For solid fuel burning appliances see 780 CMR 3610.

780 CMR 3619.2 RETURN AIR

3619.2.1 Return air: Return air shall be taken from inside the dwelling, but may be diluted with outdoor air.

3619.2.2 Required area: The total unobstructed area of return ducts or openings to a warm-air furnace shall be in accordance with the manufacturer's installation instructions, but not less than two square inches (1290 mm^2) for each 1,000 Btu/h (293 W) input rating of the furnace. The minimum unobstructed total area of the return air ducts or openings to a central air-conditioning unit and/or heat pump shall be in accordance with the manufacturer's installation instructions, but shall not be less than six square inches (3870 mm^2) for each 1,000 Btu/h (293 W) nominal cooling output rating.

3619.2.3 Prohibited sources: Return air for a warm-air furnace shall not be taken from bathrooms, kitchens, garages or other dwelling units. Outdoor air shall not be taken from within ten feet (3048 mm) of an appliance or plumbing vent outlet that is located less than three feet (914 mm) above the air inlet.

3619.2.4 Inlet opening protection: Outdoor air inlets shall be covered with screen having no less than ¼-inch (6.4 mm) openings and no greater than ½-inch (12.7 mm) openings.

780 CMR 3619.3 - SUPPLY AIR

3619.3.1 General: The minimum unobstructed total area of supply ducts from a warm-air furnace shall be in accordance with the manufacturer's installation instructions, but shall not be less than two square inches (1290 mm^2) for each 1,000 Btu/h (293 W) input rating of the furnace. The minimum unobstructed total area of the supply air ducts from a central air-conditioning unit and/or heat pump shall be in accordance with the manufacturer's installation instructions, but shall not be less than six square inches (3870 mm^2) for each 1,000 Btu/h (293 W) nominal cooling output rating. Dampers, grilles or registers installed for the purpose of controlling the supply airflow shall not be considered as obstructions.

NON-TEXT PAGE